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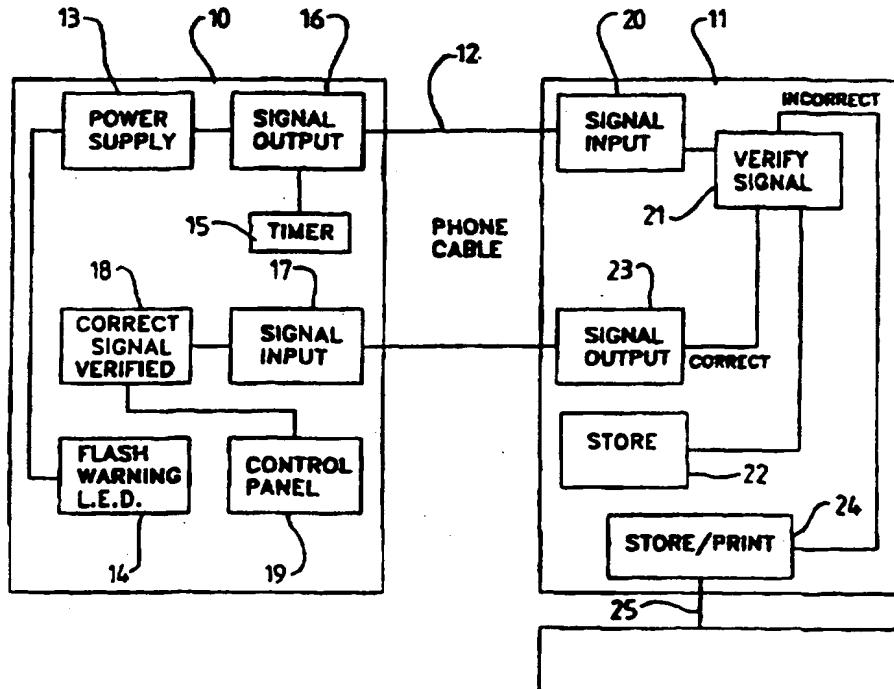
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(54) Title: ENHANCING SECURITY OF ELECTRICAL APPLIANCES



(57) Abstract

An electrical appliance is arranged to generate an identification signal which carries information as to its identity, which signal is transmitted to a monitoring station which checks the identification signal against a recorded location of the appliance, and if the location of the appliance is correct then an authorisation signal is transmitted to enable the appliance to operate.

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Title: **Enhancing Security Of Electrical Appliances**

Description of the Invention

This invention relates to a method and means for enhancing the security of electrical appliances against theft, by enabling the location of an appliance to be traced when the appliance is used and thus the unauthorised use of an appliance at a location other than its proper location identified.

The term "appliance" as used herein is intended to include items of all types of electrical or electronic equipment typically used in the domestic, industrial or commercial environment. By way of example but not limitation, such equipment includes televisions, personal computers, telecommunications appliances of all types e.g. facsimile machines and telephones, video recorders, hi-fi equipment, photocopiers and so on.

Theft of such appliances is a major problem. One reason for this is that if such an appliance should be stolen it is easily used by the thief or someone who acquires it from the thief and the likelihood of the appliance being traced is minimal. The present invention addresses this problem.

According to one aspect of the invention, I provide an electrical appliance comprising means for generating an identification signal carrying information as to the identity of the appliance, and means for transmitting said identification signal by way of a telecommunications system to a monitoring station at another location.

Preferably the appliance comprises means for receiving a further signal, herein called the authorisation signal, and means for preventing operation of the appliance unless said authorisation signal is received.

The authorisation signal may be received from the monitoring station by means of the telecommunications system, or it would be within the scope of the invention if the authorisation signal were to be provided by a user of the appliance e.g. by operation of an alpha-numeric keypad on the appliance.

The identification signal may comprise a serial number of the appliance and/or other information enabling the appliance to be identified.

The means for transmitting the identification signal conveniently comprises means for providing an output by way of an electrical cable adapted to be connected to a telecommunications socket outlet such as is generally provided in domestic, commercial or industrial premises by telecommunications companies such as British Telecom.

It would be within the scope of the invention, however, for the identification signal to be transmitted and/or the authorisation signal received by radiation, if the telecommunications system making use of such transmission is one which enables the location of the appliance to be identified.

Preferably the identification signal is arranged to be generated and transmitted each time the appliance is switched on, requiring the reception of the authorisation signal if the appliance is then to operate normally. Alternatively or additionally the signal may be generated at timed intervals.

The means for generating the identification signal and the means for responding to the authorisation signal preferably are afforded by an electronic circuit element or elements incorporated in or in association with an electronic circuit which the appliance has for its normal operation. For example, a circuit board of the appliance may be provided with an additional "chip" or chips as appropriate. If such components are incorporated in or added to an existing circuit of the appliance, it is more difficult for them to be isolated from the existing circuit and disabled if the appliance is stolen.

In principle, therefore, an appliance in accordance with the invention requires not only to be connected to an electrical supply to enable it to operate but also to have a connection made to a telecommunication system. Thus the possibility exists of identifying the location of the appliance as described hereafter.

The invention may be applied to individual components of an appliance as an alternative or in addition to an appliance as a whole. The term

appliance as used herein is intended to be understood as including, where appropriate, such a component or components.

An example of an appliance wherein the invention may be applied to components thereof is a personal computer system which includes readily disconnectable and removable components such as keyboard, monitor, printer, and so on, and also less readily removable components such as a hard disc drive, floppy disc drive or drives, and so on. Each of such components may be provided with means for generating an identification signal, and possibly also with means for receiving and responding to an authorisation signal, as described above.

In the case of an appliance such as a computer where one or more components thereof incorporate aspects of the invention, the appliance preferably incorporates a single means with which the components communicate, for transmitting an identification signal which may include signal parts representing the individual components of the appliance. The single means with which the components communicate may respond to the authorisation signal to enable the appliance as a whole to operate.

A matter of great concern in the computer industry is that of software "theft", which term is applied to the unauthorised copying and distribution of software. A computer in accordance with the invention may include means for transmitting an identification signal afforded by software with which the computer is programmed. The computer may be enabled to operate only if the monitoring station finds that the relevant piece of software is installed at the location of an authorised user of such software.

For identifying the location of the appliance, the invention further provides that at the monitoring station to which the appliance is connected by the telecommunications system, there may be means for tracing the source of the identification signal. Operators of telecommunication systems are of course provided with means for tracing the source of signals they receive, for the purpose of billing their subscribers, and therefore an organisation operating a

telecommunications system is by its nature provided with the wherewithal to identify the location at which the appliance is being used.

Preferably there is further provided, at said monitoring station, means for storing information as to the identity of appliances and the normal locations at which they are operated, means for comparing whether the traced location of operation of an appliance is the same as the normal location thereof, and means for giving an indication if the locations are not the same as one another.

If the locations are not the same as one another, this may cause the police or other security service to be notified to enable the discrepancy to be investigated.

If the locations are the same as one another, this may cause the authorisation signal to be transmitted from the monitoring station to be received by the appliance to enable the appliance to operate.

The monitoring station may include means for storing information as to the identity of components of appliances such as computers and the normal locations thereof, and/or of authorised users of computer software, to enable illegal copies of the latter to be detected.

According to another aspect of the invention, I provide a method of enhancing the security of an electrical appliance against theft, comprising generating from the appliance an identification signal carrying information as to the identity of the appliance, transmitting said signal from the appliance to a monitoring station by way of a telecommunications system, tracing the location of the appliance from the identification signal received at the monitoring station, and comparing the traced location of the appliance with stored information as to the normal location of the appliance.

Preferably the method further comprises transmitting an authorisation signal from the monitoring station to the appliance if said locations are the same as one another, to enable the appliance to operate normally, and giving a warning if the locations are not the same as one another.

Thus the characteristic features of the present invention are that an appliance should be provided with an addition to its electronic circuitry to generate and transmit the identification signal each time the appliance is switched on, and preferably also respond to the reception of the authorisation signal. There is provided means for transmitting and receiving the signals to a monitoring station by way of a telecommunications system.

At the monitoring station there is required to be established a means for receiving the identification signal from the appliance and comparing the identified location of the appliance with a stored record of the normal location at which the appliance is used. If the comparison is satisfactory, then use of the appliance apparently is acceptable, but otherwise it is indicated that the appliance may have been stolen.

When the appliance is to be used, it is required to be connected not only to an electrical supply but also to the telecommunications system. When the appliance is switched on, the above-described operations take place.

A person buying an appliance in accordance with the invention must register the appliance and its identity with an organisation or individual operating the monitoring station. It is anticipated that the organisation or individual fulfilling this function will establish a computerised system for carrying out these operations.

The invention will now be described by way of example with reference to the accompanying drawing, which illustrates in diagrammatic form the main operative elements provided in a system in accordance with the invention.

Referring to the drawing, an electrical appliance is indicated generally at 10, and a monitoring station by a telecommunications system at 11. A connection between the appliance and monitoring station is indicated at 12, the telecommunications system being able to transmit signals in both directions between the appliance and monitoring station by any known means such as, for example, electrical cables, fibre optics, terrestrial radio links, satellite links, and so on.

Internal components of the appliance 10 involved with the present invention are a power supply 13 and security system indicator 14 such as a lamp or light emitting diode which may operate in a flashing manner; a timer 15, and an identification signal generating means 16. The identification signal generating means 16 has an output connected to the telecommunications system 12, such output being preferably by way of a cable having a plug engageable with a standard telephone outlet socket. The appliance 10 further comprises an authorisation signal receiving means 17 and a means 18 for responding to the authorisation signal by checking its correctness and, if it is correct, enabling normal operation of the appliance by way of its controls 19.

The monitoring station 11 includes a means 20 for receiving, by way of the telecommunications system 12, the signal provided by the signal generating means 16. It includes means for determining the location of the source of the signal, thus determining the location of the appliance. The monitoring station further comprises a means 21 for comparing the signal and its identified location with the contents of a store 22 of identification signals and their normal locations, and determining whether the location of the appliance whose signal has been received is correctly in accordance with its normal location. If the comparison shows that the location of the appliance is correctly in accordance with its normal location as stored at the monitoring station, then an authorisation signal generating means 23 is caused to transmit an authorisation signal by way of the telecommunications system 12 to the authorisation signal receiving means 17 of the appliance 10. The appliance may then be used normally.

If the detected location of the appliance 10 is not that which is stored by the monitoring station, then a signal is caused to be provided to an indicating means 24 which may store and/or display and/or print the details of the detected usage and location of the appliance, e.g. date, time, address, and so on. An output 25 may be provided, to enable the police or other security service to be notified.

In use of the appliance equipped as above described, upon this being switched on electrical power is supplied by the power supply 13 to the warning indicator 14 and to the timer 15 and identification signal generator 16. The indicator 14 provides a reminder that the output connection of the identification signal generator should be connected to the telecommunications system as indicated at 12. The timer 15 instructs the identification signal generator 16 to transmit the identification signal of the appliance upon switch on and/or at preset time intervals. The identification signal as received at the monitoring station is processed as above described, and the authorisation signal receiver 17 of the appliance receives such signal from the monitoring station. The authorisation signal is verified at 18, and if all is correct then the controls 19 of the appliance are enabled to operate normally. If an authorisation signal is not received, or an incorrect authorisation signal received, then the controls 19 of the appliance are not enabled to operate.

It is, of course, necessary for operation of the system as described above that the store 22 at the monitoring station should include a record of identification signals of appliances and their normal locations. It is envisaged that the purchaser of an appliance will, upon purchase, register his appliance and address with an organisation operating the monitoring station. As above referred to, it is also envisaged that the invention may be applied to individual components of appliances such as computers, and further may be applied to computer software. In this latter case, upon the software being bought into operation it would cause an identification signal for such software to be transmitted to the monitoring station, which if the location of the computer having the software is that which has been recorded at the monitoring station will then transmit an authorisation signal to enable operation of the computer. In the case of computer software, it is envisaged that the provider of a particular piece of software would register its identification signal and authorised location with an organisation or individual operating the monitoring station.

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

CLAIMS:

1. An electrical appliance comprising means for generating an identification signal carrying information as to the identity of the appliance, and means for transmitting said identification signal by way of a telecommunication system to a monitoring station at another location.
2. An appliance according to Claim 1 further comprising means for receiving an authorisation signal, and means for preventing operation of the appliance unless said authorisation signal is received.
3. An appliance according to Claim 2 adapted to receive the authorisation signal from the monitoring station by means of the telecommunication system.
4. An appliance according to any one of the preceding claims wherein the identification signal comprises a serial number of the appliance.
5. An appliance according to any one of the preceding claims wherein said means for transmitting the identification signal comprises means providing an output by way of an electrical cable adapted to be connected to a telecommunications socket outlet.
6. An appliance according to any one of the preceding claims wherein the identification signal is arranged to be generated and transmitted each time the appliance is switched on.
7. An appliance according to any one of the preceding claims wherein the means for generating the identification signal and the means for responding to the authorisation signal when present are afforded by an electronic circuit element

incorporated in or in association with an electronic circuit which the appliance has for its normal operation.

8. An appliance according to any one of the preceding claims wherein the identification signal includes signal parts representing individual components of the appliance.

9. An appliance according to Claim 8 comprising a single means, with which said components communicate, for generating an identification signal.

10. An appliance according to any one of the preceding claims which is a computer.

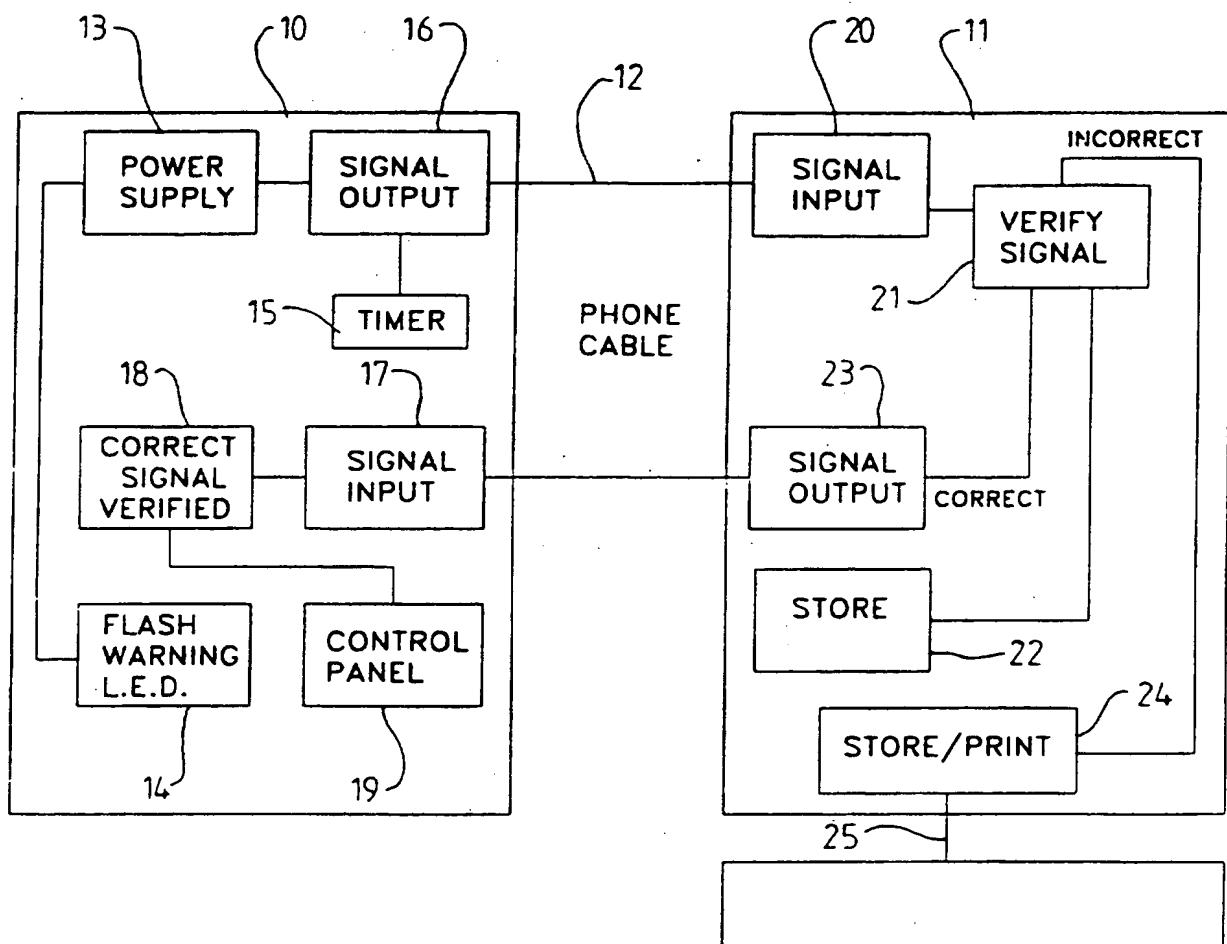
11. An appliance according to Claim 10 comprising means for generating an identification signal representative of software with which the computer is loaded.

12. A method of enhancing the security of an electrical appliance against theft, comprising generating from the appliance an identification signal carrying information as to the identity of the appliance, transmitting said signal from the appliance to a monitoring station by way of a telecommunication system, tracing the location of the appliance from the identification signal received at the monitoring station, and comparing the traced location of the appliance with stored information as to the normal location of the appliance.

13. A method according to Claim 12 further comprising transmitting an authorisation signal from the monitoring station to the appliance if said locations are the same as one another, to enable the appliance to operate normally, and providing a warning if the locations are not the same as one another.

14. A system for carrying out the method of Claim 12 or Claim 13, comprising an appliance according to any one of Claims 1 to 11, and the monitoring station.
15. A system according to Claim 14 wherein the monitoring station comprises means for tracing the source of an identification signal received at the monitoring station.
16. A system according to Claim 15 further comprising, at the monitoring station, means for storing information as to the identity of appliances and the normal locations at which they are operated, means for comparing whether the traced location of operation of an appliance is the same as the normal location thereof, and means for giving an indication if the locations are not the same as one another.
17. An electrical appliance substantially as hereinbefore described.
18. A method of enhancing the security of an electrical appliance against theft, substantially as hereinbefore described.
20. Any novel feature or novel combination of features described herein and/or in the accompanying drawings.

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 95/01703

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 6 G08B25/01 G06F1/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 6 G08B G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP,A,0 387 581 (BLAUPUNKT-WERKE GMBH) 19 September 1990 see the whole document ----	1-4,6,8, 9,12-16, 18,20
X	US,A,5 056 140 (KIMBELL) 8 October 1991 see the whole document -----	1-3, 5-14, 17-20

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Information on patent family members

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EP-A-387581	19-09-90	DE-A- 3908029 DE-C- 3918052 DE-D- 59005401 ES-T- 2054121	13-09-90 22-11-90 26-05-94 01-08-94
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